

REMARKS

The objection to the drawing and the rejections of Claims 7 and 8 under 35 U.S.C. § 112, ¶ 1 and 2, to the extent not deemed moot by the foregoing amendments, are traversed. Reconsideration, if necessary, is respectfully requested.

Although Claim 7 has now been replaced by Claim 17 (along with new method Claim 18) and the term “rich-and-lean distribution” has been replaced, it is erroneous for the Office to require the showing of a fuel distribution of any type. Such a showing is particularly inappropriate given the structure illustrated for providing such distribution coupled with the ordinary level of skill in this art that would require no further illustration for a complete understanding.

Applicants have now submitted new Claim 17 to eliminate any issues concerning written description and indefiniteness. Clear antecedent basis for the claim terminology is found, for example, at page 12, lines 10-17 (strong flow velocity/weak flow velocity), page 19, lines 10 and 11 (concentrated/non-concentrated) and page 21, lines 13-17 (deep part/light part). In addition, Figs. 1, 3, 4A, 5A, 6 and 7 provide an adequate illustration of the claimed parts and distributions.

The rejection under ¶ 2 of Section 112 is misplaced. The Office’s reasoning acknowledges an applicant’s right to include functional recitations in apparatus

claims but then uses this right to allege claim indefiniteness or grounds of critical elements being missing. To the extent that a claim is too broad, however, the appropriate rejection is one based upon prior art to show that an applicant is not entitled to such breadth.

The “how” issue raised with regard to the length of the orifice is equally unmeritorious. There can be no serious argument that, given the high level of ordinary skill in this art, the original disclosure would have been more than ample to allow a person with that ordinary skill to determine orifice length without anything approaching unreasonable or undue experimentation. In any event, Applicants trust that the alternative language they have employed will also eliminate indefiniteness as an issue.

The rejection of Claims 7 and 8 as being anticipated by Shibata et al., under 35 U.S.C. § 102(b) is traversed, and reconsideration is respectfully requested.

The Patent and Trademark Office has to be wary of asserting unpatentability on grounds that the prior art has “the ability to perform the function” when, in fact, it says or implies nothing about that function. The mere fact that an orifice has length does not allow a logical jump to the conclusion raised in the Office Action.

To understand more precisely what the present invention is, Applicants first would like to point out that when a swirl is applied to fuel upstream of an

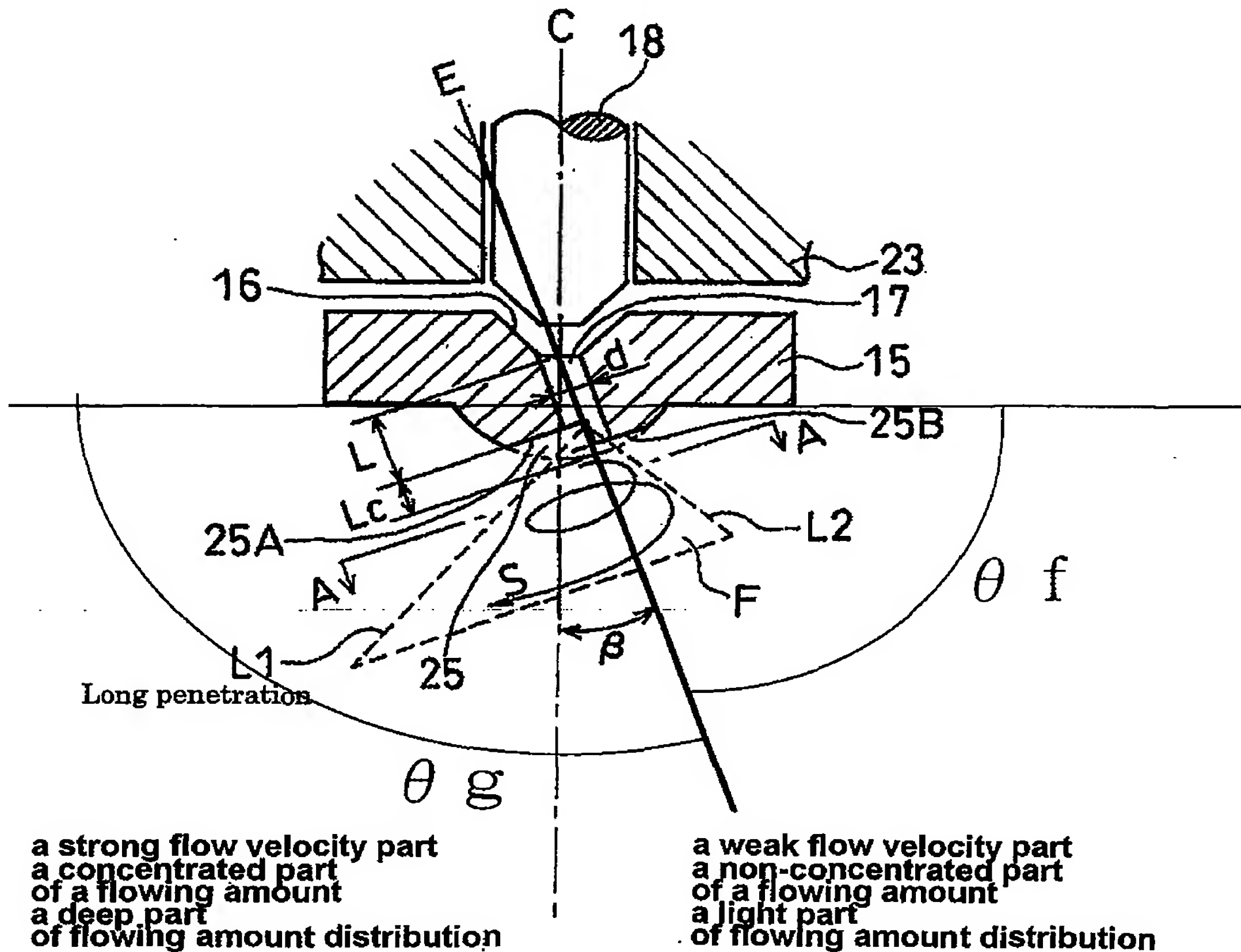
orifice arranged non-parallel with a center axis of an injector, the fuel flow is deflected owing to flow resistance when the fuel flows into the non-parallel orifice. As a result, a flowing amount and a non-concentrated part of a flowing amount, or a deep part of flowing amount distribution and a light part of flowing amount distribution of fuel are formed. These parts advance to an exit of the orifice while turning of changing the position in a circumferential direction. Applicants recognized that, when the length of the orifice is changed, the positions of the parts at the exit of the orifice are also changed.

The present invention is one in which the length of the orifice or the cutting position of the orifice are adjusted so that the strong flow velocity part, the concentrated part of the flowing amount, or the deep part of the flowing amount distribution of fuel is formed in a direction opposite to that of the orifice deflection and in the circumference of an exit of the fuel injection hole, with a swirl to the fuel by a fuel turn member. The long penetration part of the fuel spray is not directed to a spark plug as in Shibata, et al., but to a cylinder as shown in Fig. 11A. The homogenous combustion attained with this configuration is explained at page 23.

Applicants submit two views that illustrate the differences between their invention (Sketch 1) as explained above and that of Shibata et al. (Sketch 2).

SKETCH 1

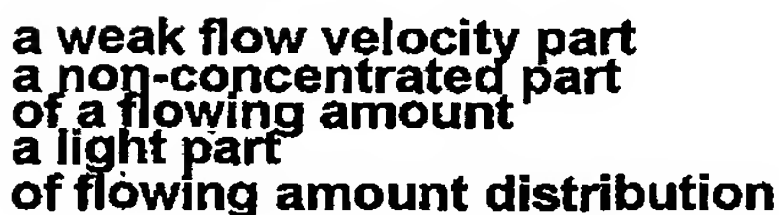
Present Invention



Unlike the present invention, Shibata et al., did not recognize that the adjustment of the orifice's length or cutting position could produce the long penetration of the fuel spray to the cylinder instead of the spark plug. In Shibata et al., the strong flow velocity part, the concentrated part of the flowing amount, or the deep part of the flowing amount distribution of fuel is formed in the same direction as the deflection of the orifice, as seen below:

SKETCH 2

Shibata's Invention



a strong flow velocity part
a concentrated part
of a flowing amount
a deep part
of flowing amount distribution

The foregoing should now make it apparent that the present invention operates in a manner different from that of Shibata et al. Regardless of whether the prior art does or does not have the capability to achieve what applicants have achieved, the prior art does not teach how to achieve this objective because it did not recognize the objective and seek to achieve it.

Accordingly, early and favorable action is earnestly solicited. To the extent that any questions remain after consideration of the foregoing, however,

Applicant's undersigned representative requests an interview with the Examiner before any further official action is taken.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #056207.52747US).

Respectfully submitted,

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